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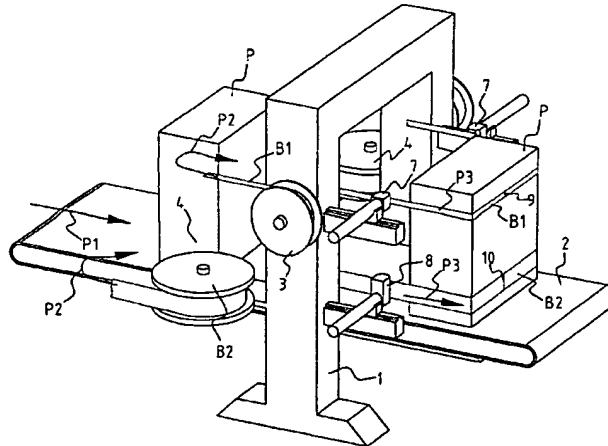
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(54) Title: DEVICE FOR APPLYING AT LEAST TWO STRAPS AROUND A PACKET



(57) Abstract: Device for arranging at least two bands (B1, B2) around one or more packets (P), substantially consisting of a frame (1), a lying conveyor belt (2) supported by the frame for moving forward the packets, band clamping and guiding means which move transversely of the conveyor belt away from and toward each other and which are connected to associated supply reels for the strapping band B1, B2), welding means (7, 8) for welding together the bands which have been moved toward each other, wherein a first group of band clamping and guiding means has a first pair of jaws (7) for a first band type, and a second group has second pair of jaws (8) for a second band type, which groups arranged one above the other. In this manner the one or more packets can be strapped with two or more band of a specific type, for instance subject to the required firmness, via one passage through the device according to the invention.

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## DEVICE FOR APPLYING AT LEAST TWO STRAPS AROUND A PACKET

The invention relates to a device for arranging at least  
5 two bands around one or more packets, substantially  
consisting of a frame, a lying conveyor belt supported by the  
frame for moving forward the packets, band clamping and  
guiding means which move transversely of the conveyor belt  
away from and toward each other and which are connected to  
10 associated supply reels for the strapping band, welding means  
for welding together the bands which have been moved toward  
each other.

Such devices for strapping a number of packets using a  
band are for instance described in the patents NL 7314312 and  
15 EP 98202234 in the name of applicant. These embodiments have  
the drawback that the device is only suitable for arranging  
one or more bands of the same type per passage of the one or  
more packets. Particularly when high packets must be  
strapped, according to the prior art the packet for strapping  
20 must pass through different devices.

The invention has for its object to provide a device and  
a method whereby two or more bands, which can be of different  
types, are arranged in one passage of the packets for  
strapping and wherein the packet can be provided with a  
25 label.

For this purpose the invention is distinguished by a  
first group of band clamping and guiding means which has a  
first pair of jaws for a first band type and a second group  
which has a second pair of jaws for a second band type, which  
30 groups are arranged one above the other.

In this manner the one or more packets can be strapped  
with two or more bands of a specific type, for instance

subject to the required firmness, via one passage through the device according to the invention.

According to a first embodiment relating to a strapping with two bands, the two lower and the two upper band portions  
5 are brought toward each other in one movement, whereupon both pairs of band portions are fixedly clamped and are then separated and welded in a known manner, as described for instance in NL 7314312.

According to a second embodiment relating to a strapping  
10 with two bands, the upper band parts are first moved toward each other, separated and welded, whereafter the carrier of the welding means is moved downward to the lower band portions, which are then separated and welded. This second embodiment has the advantage that only one carrier provided  
15 with welding means for any type of band is required.

It will further be apparent that both embodiments can be readily enlarged into devices for strapping with more than two bands.

One group of band clamping and guiding means is  
20 preferably suitable for a band of the film type. This type of band has the advantage that it can easily be provided with a means of identification, for instance by printing text or adhering a label thereto. On the other hand, this type of band is more expensive than the standard strapping bands, and  
25 since it generally suffices to arrange only labels on this type of band, a cheaper type can be chosen for the other band or bands.

According to an embodiment, the second band is wider than the first band, wherein the wider band can for instance then  
30 be provided in practical manner with a means of identification.

In a first preferred embodiment of the device according to the invention, each jaw of the first pair of jaws has a

clamping surface which runs transversely relative to the direction of movement and which co-acts with a counter-surface of an intermediate body carried by one of the jaws, wherein at least one of the surfaces is provided with tooth-like protrusions lying in a direction opposite to the pulling  
5 direction.

According to another feature of the present invention, each jaw of the second pair of jaws, which is for instance suitable for arranging a band of the film type, has a guide  
10 surface which runs transversely relative to the direction of movement and which co-acts in each case with a motor-driven supply roll. The setting of the speed of the conveyor belt and the speed of the rolls ensures that the film can be placed round the packet with a randomly adjustable tension.

15 The invention further relates to a method for arranging at least two bands one above the other around one or more packets, wherein each band, which is formed by fastening together at their outer ends two bands unrolled in each case from a supply roll, is trained in a U-shape round the or each  
20 packet, whereupon each pair of band portions extending around the or each packet in a U-shape are pressed toward each other along the object, adhered to each other and severed such that a band again extends between each pair of supply rolls.

The method is distinguished in that the type of the at  
25 least two bands is chosen according to the height on the one or more packets, and that for each band each of the two band portions pressed toward each other is fixedly clamped, moved toward each other, welded together and separated.

This method makes it possible to firmly strap the one or  
30 more packets in one passage thereof with at least two bands, the type of which is related to the height position on the packets.

According to a first variant of the method according to the invention, each band of the bands to be arranged one above the other is fixedly clamped, welded together and separated simultaneously and in one movement.

5        According to another variant of the method according to the invention each band of the bands to be arranged one above the other is successively sought, fixedly clamped, welded together and separated. In this manner only one pair of clamping and welding jaws is required for arranging each band  
10 of the same type.

The invention will be further elucidated with reference to the annexed drawing and the figure description hereinbelow, in which a number of embodiments of the device according to the invention are illustrated.

15        In the drawing:

figure 1 shows a perspective view of a first embodiment of the device according to the invention;

figure 2 shows a perspective view of a second embodiment of the device according to the invention;

20        figure 3 shows a perspective detail view of the band clamping and guiding means of the embodiment shown in figure 2;

figures 4 and 5 show perspective views of the band clamping and guiding means of the embodiment shown in figure  
25 2 during a possible embodiment of the method according to the invention.

According to a first embodiment, and as shown in figure 1, the device has a portal-like frame 1, although the skilled person will appreciate that this frame can take a random  
30 form. Running below the portal is a conveyor belt 2 for moving the packets P for strapping in the direction of arrow 1.

The band B1 and film B2 for arranging are pulled respectively from supply reels 3 and 4 (see arrow P2) and guided to clamping and welding jaws 7 and 8 via resistance mechanisms and return pulleys (not shown). A corresponding configuration can be found on the other side of the portal. In the drawing the welding jaws 7 and 8 are each provided with separate support frames, although it will be apparent that they can equally well be mounted on the same support frame when the two bands are moved towards each other in a single movement.

Both ends of band B1 and film B2 respectively are in each case welded together at 9 and 10 respectively. The clamping and welding jaws 7, 8 are moved toward each other, wherein band B1 and film B2 are nestled under tension against the rear side of the packets P for strapping.

Band B1 and film B2 are then clamped fixedly on either side, whereupon the band and the film are cut through on both sides and the corresponding band and film ends are welded together.

Each clamping jaw 7 of the band B1 which in this embodiment is of the strap type, is advantageously embodied with a clamping surface which is provided with teeth protruding in a direction opposite to the pulling direction in order to prevent slippage resulting from the tensile force. Such clamping jaws are described in detail in the European patent application EP 98202234 of applicant.

Each clamping jaw 8 of band B2, which in this embodiment is of the film type, has a guide surface which runs transversely relative to the direction of movement and which co-acts in each case with a motor-driven supply reel 4. The setting of the speed of conveyor belt 2 and the speed of rolls 4 ensures that the film can be placed round the packet with a randomly adjustable tension.

A second embodiment is shown in figure 2. Frame 1 is provided on either side with a support frame 11 with clamping and welding means, which support frames are shown in detail in figure 3.

5 At the top of the support frame are arranged guiding and welding means 8 for a band B2 of the film type, while clamping and welding means 7 for a band B1 of the strap type are built in at the bottom. The latter has a left-hand and right-hand welding jaw 13, 13' which are built into a two-  
10 part sleeve-like housing 14. Band portions B1 are guided over respective guide surfaces 15, 15'. For a detailed description of all components of these jaws reference is made to the patent EP 0 890 510 of applicant.

As shown in figure 2, frame 1 is provided with a  
15 motorized beam 12 to which the support frames 11 are connected, which beam 12 can be moved up and downward using control means, as designated with arrow P4, such that the height of support frames 11 can be adjusted. Control means are likewise further provided for carrying support frames 11  
20 towards each other in the direction of arrow P5.

The method of the invention wherein each band of the bands to be arranged one above the other is successively sought, fixedly clamped, welded together and separated, is illustrated with reference to figures 4 and 5. Step (a) of  
25 figure 4 shows the step wherein a band B1 of the strap type has been sought and taken up by the guiding means. Both support frames are then moved towards each other until the lower pair of welding jaws are mutually engaging, as shown in steps b and c. In step c the band portions are adhered to  
30 each other and separated. The band of the strap type B1 is then sealed round the one or more packets and also separated from the band parts coming from supply rolls 3 with their ends fixed to each other, so that the support frames can move

back away from each other (step(d)) and a subsequent band can be sought.

Figure 5 shows the different steps of the movement of support frames 11 when a band of the film type is taken up.

- 5 Both support frames 11 are moved toward each other until the lower pair of guiding and welding jaws are mutually engaging, as shown in steps b and c, whereupon the upper pair of guiding jaws 8 are moved toward each other, as shown in step d. The band portions are then adhered to each other and
- 10 separated. The band of film type B2 is then closed round the one or more packets and also separated from the band parts coming from motorized supply rolls 4 with their ends fixed to each other, so that support frames 11 can be moved back away from each other (steps (d)) and a subsequent band can be
- 15 sought, or the strapped packets can be transported further when all bands B1, B2 have been arranged.

- The invention is not limited to the above described embodiment; it is thus also possible for instance to provide the device with three groups of band clamping and guiding
- 20 means, with which three different band types can be arranged.



**CLAIMS**

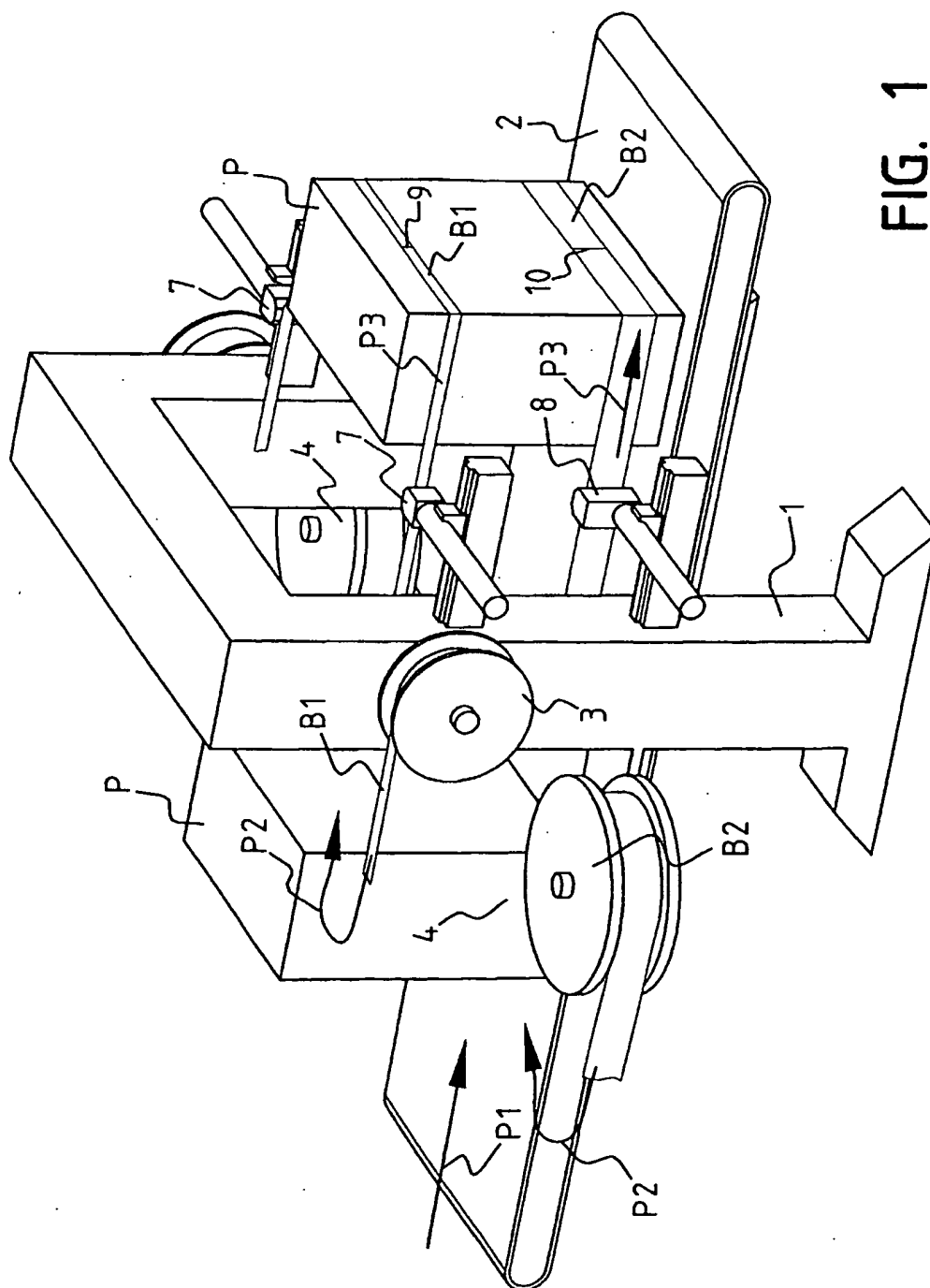
1. Device for arranging at least two bands around one or more packets, substantially consisting of a frame, a lying conveyor belt supported by the frame for moving forward the packets, band clamping and guiding means which move transversely of the conveyor belt away from and toward each other and which are connected to associated supply reels for the strapping band, welding means for welding together the bands which have been moved toward each other, **characterized in that** a first group of band clamping and guiding means has a first pair of jaws for a first band type and a second group has a second pair of jaws for a second band type, which groups are arranged one above the other.
2. Device as claimed in claim 1, **characterized in that** one of the bands is of the film type.
3. Device as claimed in either of the foregoing claims, **characterized in that** the second band is wider than the first band.
4. Device as claimed in any of the foregoing claims, **characterized in that** each jaw of the first pair of jaws has a clamping surface which runs transversely relative to the direction of movement and which co-acts with a counter-surface of an intermediate body carried by one of the jaws, wherein at least one of the surfaces is provided with tooth-like protrusions lying in a direction opposite to the pulling direction.
5. Device as claimed in any of the foregoing claims, **characterized in that** each jaw of the second pair of jaws has a guide surface which runs transversely relative to the direction of movement and which co-acts in each case with a motor-driven supply roll.

6. Device as claimed in any of the foregoing claims, **characterized in that** one of the band types is provided with a label.

7. Method for arranging at least two bands one above the  
5 other around one or more packets, wherein each band, which is formed by fastening together at their outer ends two bands unrolled in each case from a supply roll, is trained in a U-shape round the or each packet, whereupon each pair of band portions extending around the or each packet in a U-shape are  
10 pressed toward each other along the object, adhered to each other and severed such that a band again extends between each pair of supply rolls, **characterized in that** the type of the at least two bands is chosen according to the height on the one or more packets, and that for each band each of the two  
15 band portions pressed toward each other is fixedly clamped, moved toward each other, welded together and separated.

8. Method as claimed in claim 7, **characterized in that** each band of the bands to be arranged one above the other is fixedly clamped, welded together and separated simultaneously  
20 and in one movement.

9. Method as claimed in claim 7, **characterized in that** each band of the bands to be arranged one above the other is successively sought, fixedly clamped, welded together and separated.



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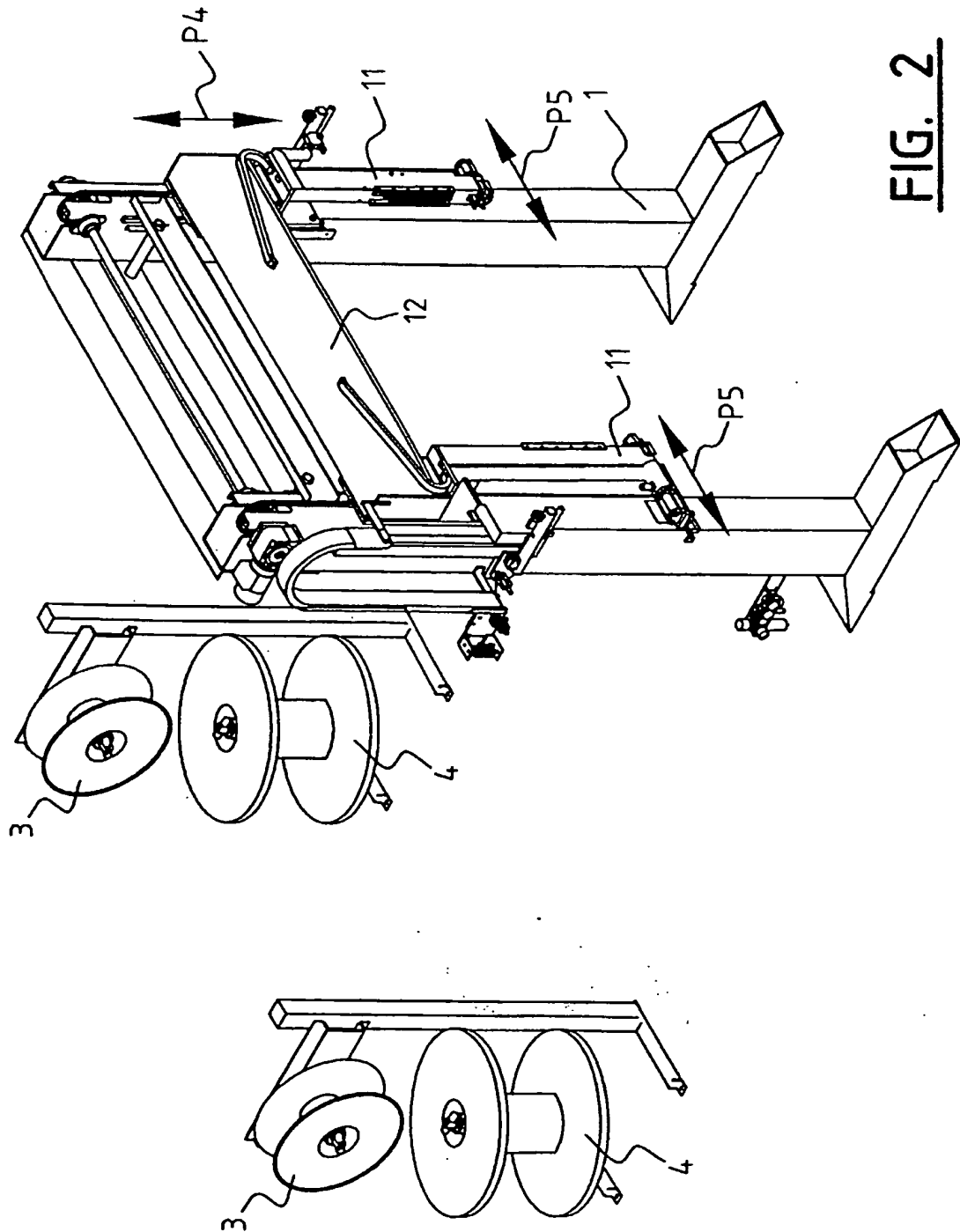
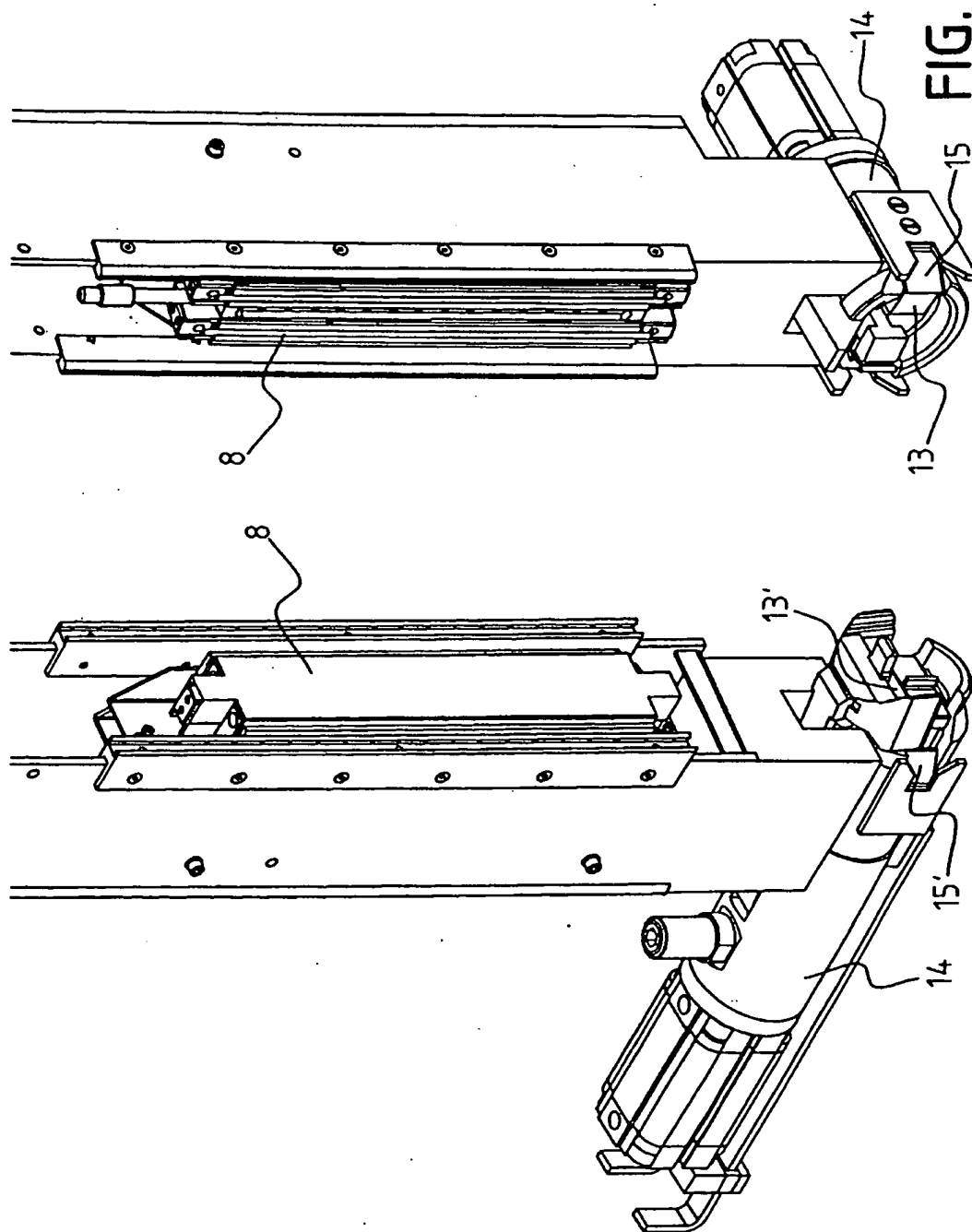
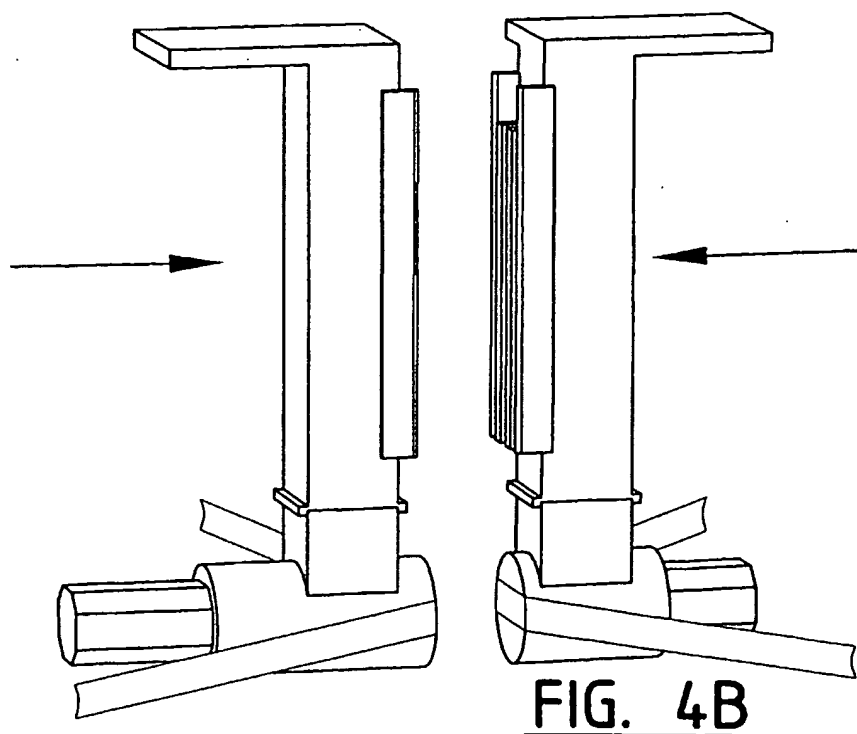
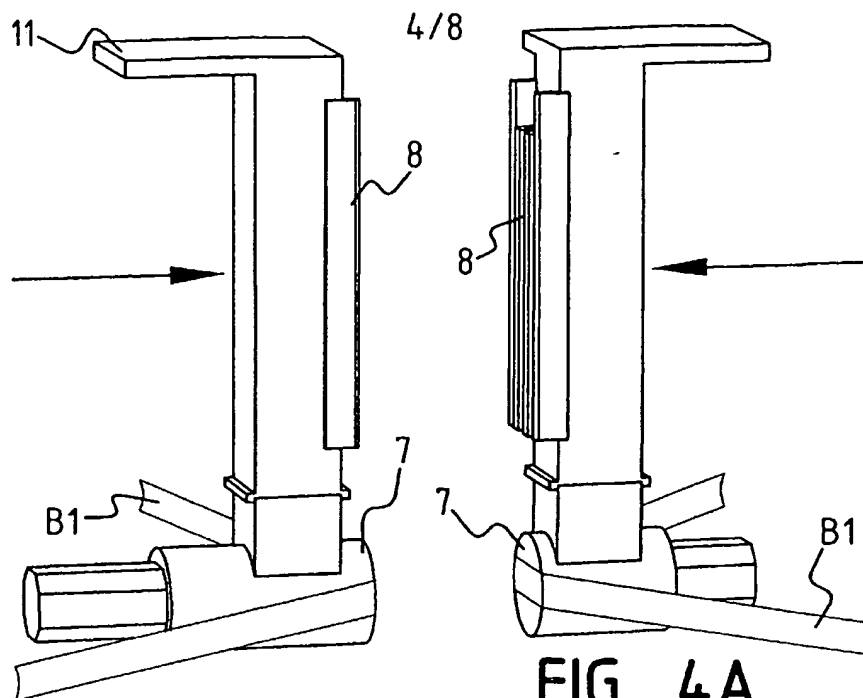
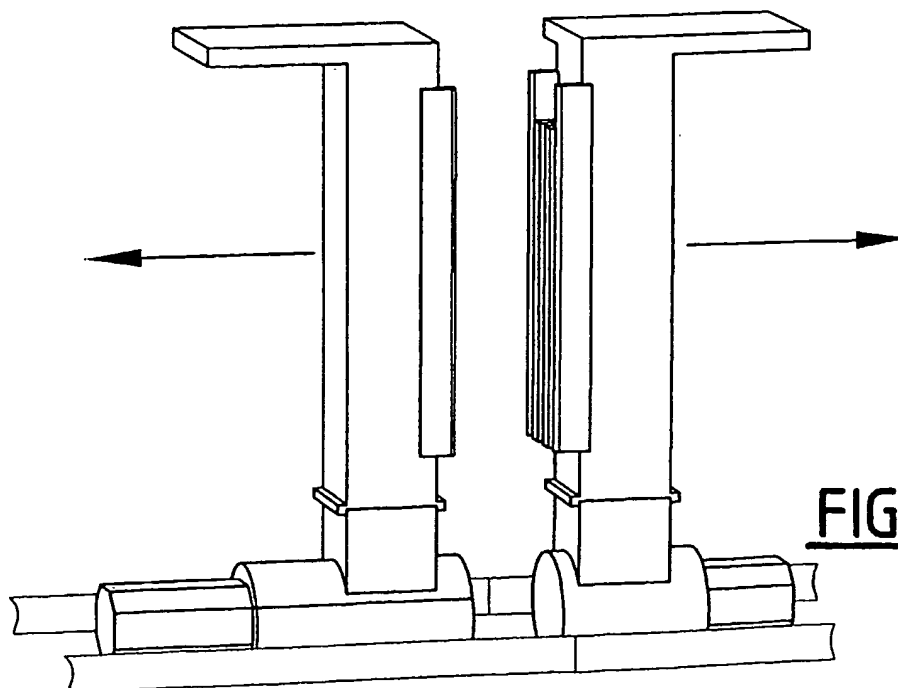
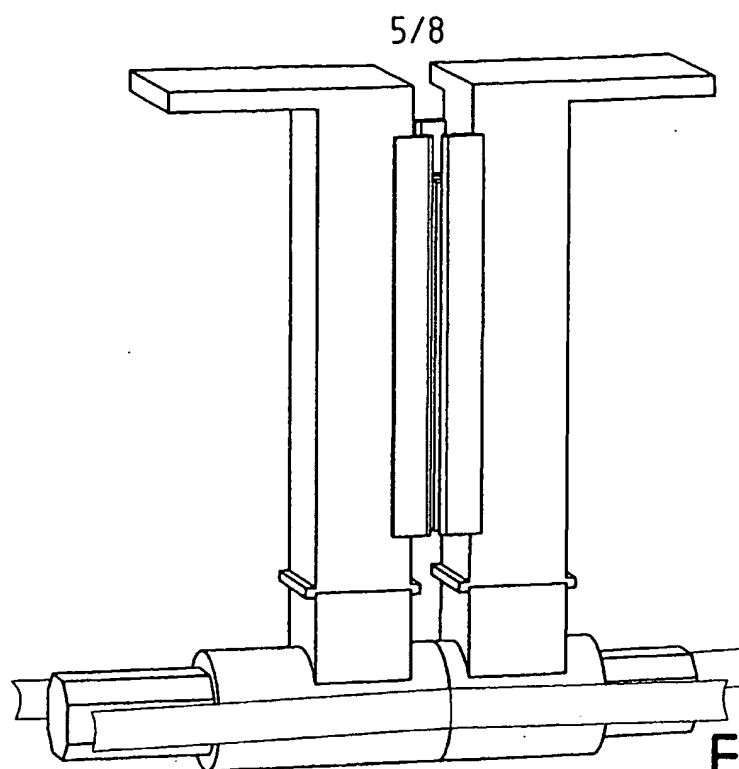


FIG. 2

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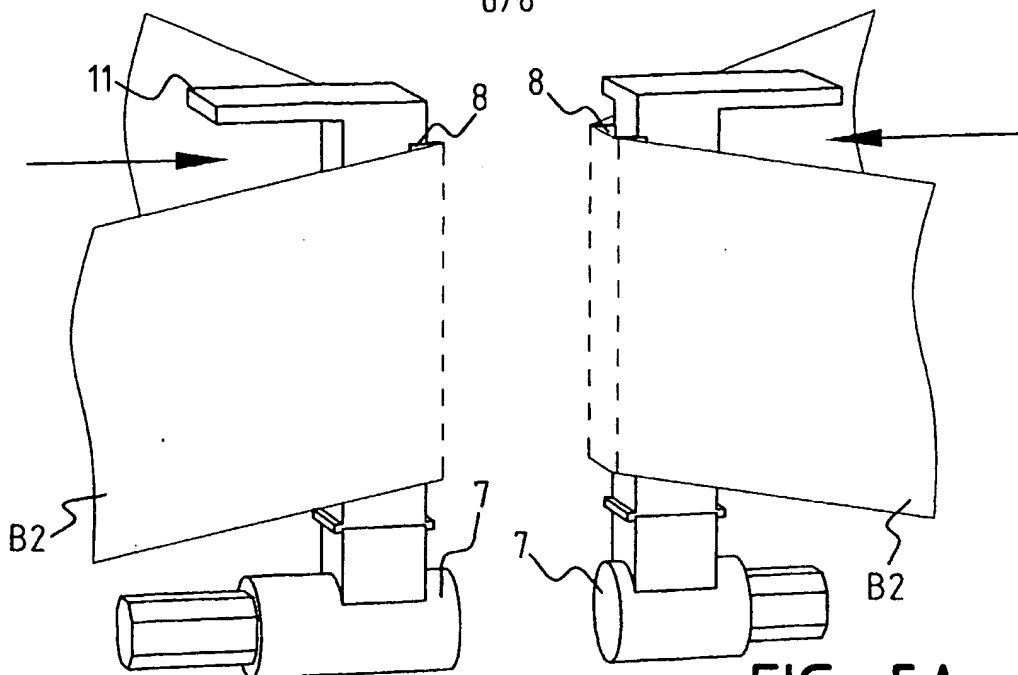


FIG. 5A

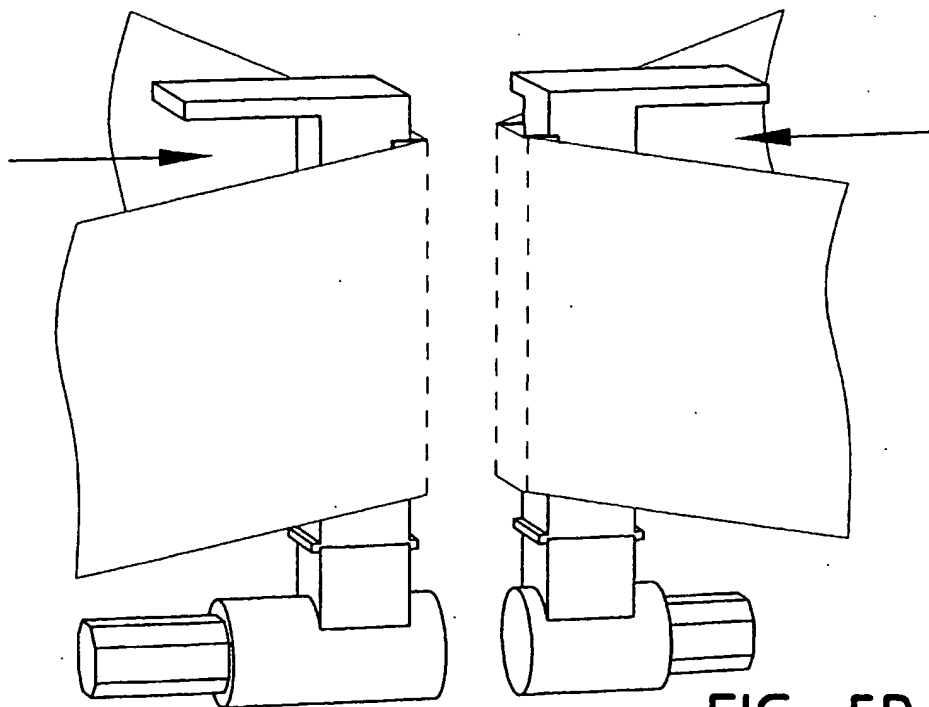


FIG. 5B



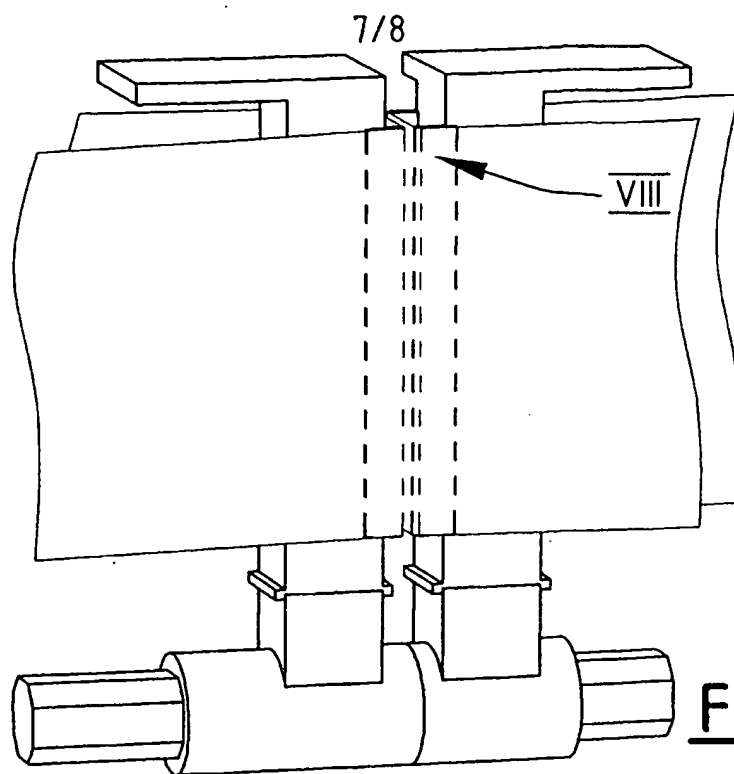


FIG. 5C

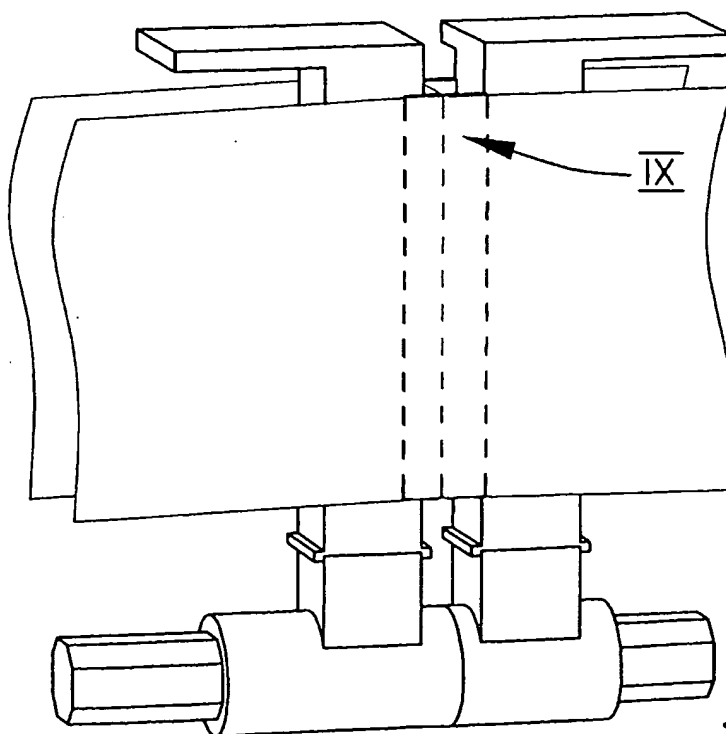


FIG. 5D

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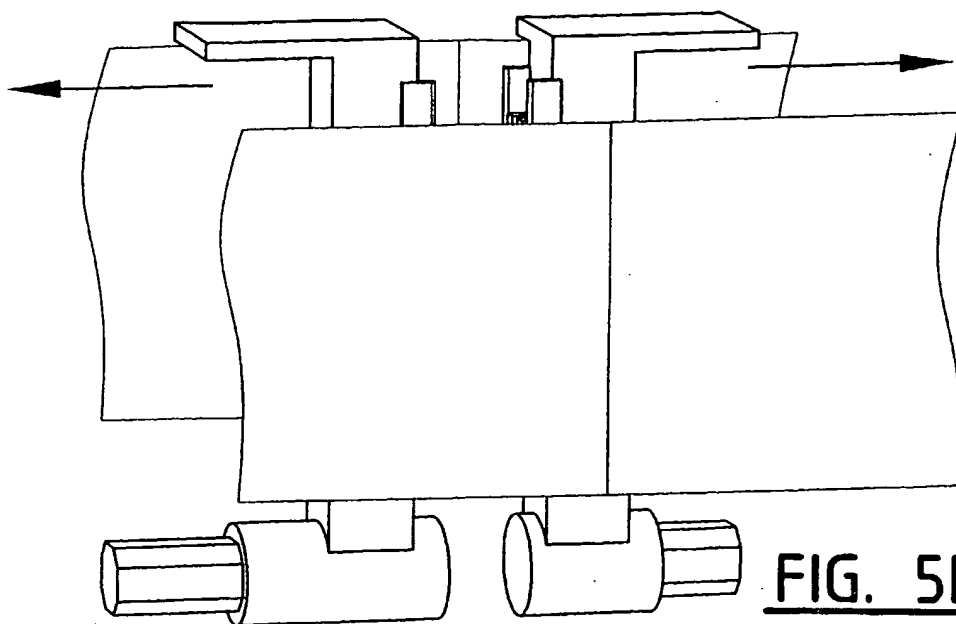


FIG. 5E

# INTERNATIONAL SEARCH REPORT

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**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 B65B13/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 592 049 A (ENDRA BV) 13 April 1994 (1994-04-13) column 1, line 21 -column 3, line 27; figures ---	1,5,7
A	GB 2 215 300 A (MAYFLOWER FINANCIAL SERVICES L) 20 September 1989 (1989-09-20) page 3, line 11 -page 6, line 26; figures ---	1,5,7
A	EP 0 061 805 A (ENDRA BV) 6 October 1982 (1982-10-06) page 4, line 25 -page 8, line 6; figures ---	1,5,7
A	DE 43 37 714 A (PKM MASCHINEN GMBH & CO KG) 11 May 1995 (1995-05-11) column 6, line 19 -column 8, line 5; figures --- -/--	1,5,7

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

19 March 2004

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29/03/2004

Name and mailing address of the ISA

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 225 665 A (ENDRA BV) 16 June 1987 (1987-06-16) ---	
A	EP 0 675 042 A (OSTMA MASCHINENBAU GMBH) 4 October 1995 (1995-10-04) -----	

# INTERNATIONAL SEARCH REPORT

PCT/NL 03/00751

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0592049	A	13-04-1994	NL	9201742 A	02-05-1994
			EP	0592049 A1	13-04-1994
-----					
GB 2215300	A	20-09-1989	NONE		
-----					
EP 0061805	A	06-10-1982	AT	14102 T	15-07-1985
			AU	548170 B2	28-11-1985
			AU	8156282 A	23-09-1982
			DE	3264492 D1	08-08-1985
			EP	0061805 A1	06-10-1982
-----					
DE 4337714	A	11-05-1995	DE	4337714 A1	11-05-1995
-----					
EP 0225665	A	16-06-1987	NL	8503373 A	01-07-1987
			AT	41636 T	15-04-1989
			DE	3662509 D1	27-04-1989
			EP	0225665 A1	16-06-1987
			JP	62135110 A	18-06-1987
			US	4782648 A	08-11-1988
-----					
EP 0675042	A	04-10-1995	DE	4411473 A1	19-10-1995
			AT	143322 T	15-10-1996
			AU	1616695 A	12-10-1995
			CA	2145888 A1	02-10-1995
			DE	59500021 D1	31-10-1996
			DK	675042 T3	10-03-1997
			EP	0675042 A1	04-10-1995
			ES	2095170 T3	01-02-1997
			GR	3021901 T3	31-03-1997
			JP	8048304 A	20-02-1996
			NO	951233 A	02-10-1995
			US	5735104 A	07-04-1998
			ZA	9502685 A	02-04-1996
-----					